EXHIBIT 614

IN THE DISTRICT COURT OF OKLAHOMA COUNTY
STATE OF OKLAHOMA

SAM JOHNSON, as Personal Representative of the Estate of Martha Bea Johnson, deceased,

Plaintiff,

vs.

ACTAVIS TOTOWA, LLC, formerly known as Amide Pharmaceuticals, Inc.; MYLAN BERTEK PHARMACEUTICALS, INC., UDL LABORATORIES, INC., WAL-MART, INC.; McBRIDE CLINIC ORTHOPEDIC HOSPITAL, INC.,

Defendants.

Case No. CJ-2009-5292

Honorable Daniel L. Owens

Oral deposition of EDWARD JOHN BARBIERI, Ph.D., taken at the office of NMS Labs, 3701 Welsh Road, Willow Grove, Pennsylvania, on Friday, November 19, 2010, commencing at approximately 9:01 a.m., before JANICE D. BURNESS, a Registered Professional Reporter, New Jersey Certified Court Reporter, and Notary Public, pursuant to notice.

APPEARANCES:

BRAD MILLER, ESQUIRE
bmiller@dlb.net
DURBIN, LARIMORE & BIALICK, P.C.
920 North Harvey
Oklahoma City, Oklahoma 73102-2610
405-235-9584
Appearing on behalf of Plaintiffs

MATTHEW P. MORIARTY, ESQUIRE
matthew.moriarty@tuckerellis.com
TUCKER ELLIS & WEST
925 Euclid Avenue, Suite 1150
Cleveland, Ohio 44115
216-592-5000
Appearing on behalf of Defendant
Actavis Totowa, LLC, formerly known as Amide
Pharmaceuticals

HUNTER K. AHERN, ESQUIRE
hahern@shb.com
SHOOK, HARDY & BACON, LLP
JPMorgan Chase Tower
600 Travis Street, Suite 1600
Houston, Texas 77002-2911
713-227-8008
Appearing on behalf of Defendants
Mylan Bertek Pharmaceuticals, Inc., and UDL
Laboratories, Inc. and Wal-Mart, Inc.

THOMAS E. STEICHEN, ESQUIRE
ELDRIDGE COOPER STEICHEN & LEACH, PLLC
tsteichen@ecslok.com
110 West Seventh Street, Suite 200
Tulsa, Oklahoma 74119
918-388-5562
Appearing on behalf of Defendant
Actavis Totowa, LLC, formerly known as Amide
Pharmaceuticals

APPEARANCES (continued):

DAVID K. McPHAIL, ESQUIRE
FOLIART, HUFF, OTTAWAY & BOTTOM
davidmcphail@oklahomacounsel.com
201 Robert S. Kerr Avenue
12th Floor
Oklahoma City, Oklahoma 73102
405-232-4633
Appearing on behalf of Defendant
McBride Clinic Orthopedic Hospital

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(It is agreed by and among counsel that all objections, except as to the form of the question, are reserved until the time of trial.)

EDWARD JOHN BARBIERI, Ph.D., having been duly sworn, was examined and testified as follows:

EXAMINATION

BY MR. MORIARTY:

Q. Tell us all your full name, please.

A. Edward John Barbieri, and it's spelled B-A-R-B-I-E-R-I.

Q. And do you go by Dr. Barbieri or Professor Barbieri?

A. Usually Dr. or just Ed.

Q. Dr. Barbieri, you have had your deposition taken before on several occasions, have you not?

A. I have.

Q. So you know that if you do not understand my question, you will let me know and I'll make it clear to you, okay?

A. Yes, I understand.

Q. If you need to take a break for whatever reason, you will let me know, okay?

A. Yes.

Q. And we can do that.

And I don't want you to guess at the answer to any of my questions. If you need to refer to the material that you brought with you, please feel free to do so, okay?

A. I understand.

Q. All right. Now, the last CV that I had available for you was January 9th of 2009.

Have you brought a more recent version of your CV?

A. Yes. I have one that I revised January 12, 2010.

Q. All right. And I'm sure you don't have these two versions memorized.

A. No.

Q. But in general, what has been added to this CV to bring it current? Is it publications or --

A. No. Maybe a couple of presentations over the year, and more testimony that were included in that list.

Q. Okay. Do you still have all the licensures that are listed in this CV?

A. Yes.

Q. And on page 7 is a list of your professional societies and activities.

Are you still involved with the

organizations that indicate through to the present?
A. Yes.
Q. Does the Society of Forensic Toxicology have ethical guidelines for people who are acting as expert witnesses?
A. Yes.
Q. Have you read them?
A. Yes.
Q. Does the Society of Forensic Toxicology also have guidelines for the way forensic investigations are supposed to be performed in a laboratory?
A. Well, there's guidelines for conducting laboratory testing, not necessarily investigations, per se. But, yes, it's combined with the American Association of Forensic Science. So it's a joint venture between the two organizations.
Q. Okay. And within the Society of Forensic Toxicology the standards or guidelines for conducting laboratory tests, are they considered aspirational or mandatory? How do you look at them?
A. They are not considered mandatory, they are considered good science. And NMS follows the -- all the recommendations that they propose in those guidelines, and we exceed many of those

recommendations.

Q. Okay. When you say good science, good science is designed to be careful. Is that correct?

A. Yes.

Q. As accurate as possible given the limitations of the equipment?

A. Yes.

Q. And good documentation of methods, correct?

A. Yes.

Q. And a good documentation of methods is done so that people coming in later to examine the lab tests can see what was done, how it was done, things of that nature, correct?

A. That's correct.

Q. All right. I'm going to go ahead and mark this CV.

I assume this is a copy we can keep?

A. Yes, it is.

Q. I'm just going to put BAR -- no, I'll put Barbieri No. 1, okay?

(Exhibit No. Barbieri 1, Curriculum Vitae of Edward John Barbieri, Ph.D., marked for identification.)

BY MR. MORIARTY:

Q. All right. That's your CV, Barbieri No. 1.
A. Okay.
Q. How much of your time currently do you spend acting as a forensic toxicologist as opposed to administering here at NMS?
A. About 90 percent of my time.
Q. Is?
A. Forensic.
Q. Is there now Board certification in forensic toxicology?
A. There is a diplomate certification.
Q. For how long has that been in existence?
A. I don't know that. It goes back many years.
Q. Do you have your diplomate --
A. I do not.
Q. -- Board certification?
A. No.
Q. Is there any particular reason why?
A. Yeah.
Q. And what's the reason?
A. Basically in order get that you have to have -- you have to be practicing in the field for at least three years, which I have that. And you have to

sit for an exam.

And because of my age and my situation in terms of I may be retiring, I decided not to sit for the exam, and the company said that's fine.

Q. Okay.

A. They accepted that.

Q. Do you have -- currently have any teaching positions?

A. I'm, I guess you can say, an adjunct professor of Arcadia University.

I do teaching in a forensic science course that the -- it's not the company -- it's an association. Dr. Rieders, who started the company, started a foundation for forensic sciences, it's at another building.

And that foundation has made an association with Arcadia University in Glenside.

So I teach for that program.

So it's not part of NMS, it's sort of an outside; but an adjunct association.

Q. What do you teach?

A. Forensic science and pharmacology.

Q. How much time per semester or year does that involve?

A. This year was the most so far. I've

given five lectures, and I have one more session. So each lecture is about an hour and half.

Q. And when you say this year, are you talking about this calendar year or this academic year?

A. It would be this academic year, in this fall semester.

Q. All right. In general, in your position here at NMS labs, you don't determine causes of death, do you?

A. No, we do not.

Q. And you don't generally render opinions about product defect?

A. In our criminalistics lab, which is in the other facility down the road, we do product integrity work. But we really don't do product defect work.

We have procedures that can measure quantitatively the amount of a drug that's in a product and we do that, but I don't know if we really render an opinion for that. I don't do that.

Q. Okay. Tell me your personal experience with postmortem blood testing. Is that a big part of your practice over the years?

A. Well, it is. Most of our forensic work

here at the company is either antemortem toxicology, which is really police work -- DUI type of work, sexual assaults -- and postmortem work.

I'd say the number of cases that I see every day, it's about a 50/50 mix of the two. And that's been pretty consistent over the years.

Q. When you say "cases I see a day," how many cases do you see a day?

A. When I'm sitting doing cases, which I try to do most days, I can do between 30 and 40 cases. That basically means that I'm taking the laboratory data, getting a composite, producing a report, and authoring that report to the client.

Q. Okay. How much experience do you have in postmortem vitreous fluid analysis?

A. Well, it's a matrix just like any other matrix. We do some vitreous work here. And so whatever experience I have, I mean it's pretty hard to quantify that. We see it. We don't do a lot in comparison to postmortem blood.

Q. Okay.

A. Or tissue work. But we do see vitreous samples.

Q. How much of your own practice is solid oral dose analysis?

A. Very little.
Q. Are there other people here at NMS who do that?
A. Again, the people in the criminalistics lab.
Q. What section is Dr. McMullin in?
A. He's not a doctor.
Q. Okay.
A. Mr.
Q. Mr. Matthew McMullin.
What section is he in?
A. He's the director of research and development at the present time.
Q. How much experience do you have with -- you personally -- postmortem analysis of digoxin in blood?
A. Very little. And the reason for that is, first of all, digoxin is not a common compound that we get here.
We do, I'd say, on average a thousand tests a day, chemical tests a day as a ballpark number. And we may do, you know, a dozen every week of digoxin.
So in the global scheme of things that we see, and because it's not a primary drug anymore in

congestive heart failure, we don't see a lot of that in terms of our testing work.

Q. And how much of that, let's just say a dozen a week, is antemortem and how much is postmortem?

A. We don't do any antemortem digoxin.

Q. All right. How much postmortem digoxin vitreous analysis do you do?

A. I've had two cases, this one and one other, over the years.

Q. I didn't see any publications in your CV about postmortem redistribution.

A. That's correct.

Q. You have never published about PMR?

A. No.

Q. And other than a blurb in the Handbook of Commonly Prescribed Drugs, I don't see that you've actually published on digoxin either.

A. That's correct. Well, there is a pharmacology text that I edited, and one of the chapters was on digoxin, so I was involved in editing that chapter. But I didn't write that chapter.

Q. What text was that?

A. This was a book called Basic Pharmacology in Medicine.

Q. By whom?
A. Well, it was four editors. It was myself, John DiGregorio, Andy Ferko and Joseph DiPalma. This was done when I was at Hahnemann. And we had a couple editions of that.
Q. In that Handbook of Commonly Prescribed Drugs the doses of .375 milligrams and .50 milligrams are listed. Is that correct?
A. I believe so.
Q. And is it your understanding that those drugs are sometimes prescribed or used to be commonly prescribed at those doses?
A. Digoxin you are speaking of?
Q. Yes.
A. Yes.
Q. All right. And certainly even people who were prescribed .50, or who still are prescribed .50 milligrams per day, don't all become digoxin toxic. Is that true?
A. That's true.
Q. Have you ever published anything about postmortem vitreous analysis?
A. No.
Q. Have you published anything about solid oral dose testing?

A. No.
Q. You have testified before in various settings about postmortem redistribution of other drugs.
A. Yes, I have.
Q. Have you ever testified about PMR of digoxin?
A. No. None of my cases and testimony have involved digoxin.
Q. Have you ever testified about postmortem vitreous analysis?
A. No.
Q. When I say "vitreous," we are talking about vitreous fluid, correct?
A. I understand, yes.
Q. Have you ever testified about solid oral dose testing?
A. I don't believe so, no.
Q. To try to capture what forensic toxicologists do, first of all, what you are trying to do is use reliable scientific methods to analyze data available to you, correct?
A. Yes.
Q. In order to reach certain conclusions from the data. Is that right?

A. That's correct.
Q. And sometimes what you are trying to do is either talk about what the human reaction would be to a dose. Is that correct?
A. If we are talking about an active product, yes.
Q. All right. Or sometimes you are trying to use reliable methods to analyze bodily fluids to go back in time and figure out what drug is on board, correct?
A. That's true.
Q. Or what the dose might have been?
A. That's more speculative, I guess we could say, because we are dealing with, you know, postmortem levels versus antemortem dosing.
Q. We will get into that a little more later.
A. Okay.
Q. But that's, in general, some of the things that you try to do in forensic toxicology?
A. It can be done, yes.
Q. Now, the material that we were given that compromised, or comprised, I'm sorry, your litigation packet was what I'm marking here as Barbieri Exhibit 2.

And this is marked with Bates Nos. Johnson 201 through Johnson 259. Okay?

(Exhibit No. Barbieri 2, Litigation Packet, marked for identification.)

BY MR. MORIARTY:

Q. I'm handing you Barbieri Exhibit 2. Could you just flip through that and let me know if that appears to you to be the NMS litigation packet for the Martha Bea Johnson blood and vitreous specimens.

A. Well, we had two packages that we had produced, so let me see how this is combined.

Q. Well, before you answer that, did you produce litigation packages separately for the blood and then the vitreous?

A. Yes.

Q. Okay.

A. We had these under two different work order numbers.

Q. I think Exhibit 2 is both together, but you let me know.

A. I just want to be sure that we are speaking about the same thing.

Okay, it looks to me, without going through each page, that this document, Exhibit 2,

represents the litigation package under this Work Order 08275619.

Q. Okay.

A. I don't think it includes the previous litigation package, which was the blood. I think this is only the vitreous portion of that.

Q. There is blood information in Exhibit 2, just so you know. It's some information closer to the front. It may not have the chromatographs, but it does have the result.

A. Yeah. It may include some materials that we had in the forensic file in which there was reference to blood results.

For example, if I could just show you, on page 6 there is a test requisition that was sent in. This came in for the vitreous, but they put some blood information in here --

Q. Okay.

A. -- for the previous work order.

Q. Okay.

A. So I just looked at the number of pages here, which kind of matches what we have here.

Q. Okay.

A. Okay. Now, if I could add to that if you don't mind, if I could interrupt you.

When I was reviewing the data this week again, I found that there were some pages that were omitted when we submitted this litigation package.

And we -- how this happened we don't know, but we found the data. It was not really analytical data.

I have a copy for you. We put this into an additional data package and we recertified those packages, and we continued the numbering for this pack so that would be part of this. I have a copy of that for you.

And, again, it's not the data, per se. It is really batch work lists, and it's the sequence file and some batch information as I say was omitted.

Q. What you just handed me I'm marking as Barbieri Exhibit 3.

A. Okay.

(Exhibit No. Barbieri 3, Additional Data, marked for identification.)

BY MR. MORIARTY:

Q. And if I understood what you just said correctly, what I've now marked as Barbieri Exhibit No. 3 should be part of Barbieri Exhibit 2.

A. That's correct.

Q. Okay. And then there is still a

separate work order litigation package for the blood specimen, correct?

A. Yes. And this was -- just for everyone's -- this was labeled with this work order, which came previous to the vitreous, 08232082.

And as I showed you on page 6, this was referred to in the test requisition form that was submitted with the vitreous.

Q. May I see the blood sample litigation package, please?

A. Certainly.

Q. Now, at the end of the deposition, just so you know, what we'll probably do is give this whole file to the court reporter, so you can copy the things and make sure we have got everything. But I just want to flip to something on this right now.

Now, this is paginated in pencil.

Is that done in advance of a deposition to keep the pages straight?

A. That's really our copy. We do it that way in case we find something that we have to add. And of course in the one that we submitted the pagination was printed on the pages.

Q. Okay.

A. And they should be identical numbers,

and they are certified with the numbers of pages that we have supplied.

Q. Okay.

A. Now, since we are speaking of these two litigation packages, can I go one step further?

Q. Sure.

A. For everybody's understanding, these litigation packages were requested to be produced, which we did, and they were sent out.

And then following the submission of this material, the specimens were returned to the submitting agency, okay?

So we made copies of -- for both of these of the sample history report, which is now more complete, that has the return information on it, the FedEx number, et cetera, et cetera, and also the chain of custody with the signatures and the dates of the individual who packaged that material.

So this is information for you. This is the one -- these two pages would be for -- this is the litigation package that would -- you marked as Exhibit 2, and Part 3, that would be these pages.

And then these two pages would be for the previous one that we were just speaking about.

MS. AHERN: The vitreous sample or blood

sample?

THE WITNESS: This is the blood sample, that's correct.

So this now, as we sit here today, is a more complete history of the sample history report and the chain of custody of materials.

BY MR. MORIARTY:

Q. So if I've got this correct, Barbieri Exhibit 4, which is two pages, is the data that you just described which pertains to the litigation package which is Exhibits 2 and 3?

A. That's correct.

Q. Okay. And then Barbieri Exhibit 5, which I'm marking now, is the transmittal data for the litigation package that I don't have a copy of, correct?

A. Well, I don't know if you don't have a copy.

Q. Well, I don't.

A. Is this the one we referred to in the blood work?

Q. But Exhibit 5 is two pages, correct?

A. Correct.

Q. And it's the transmittal data for the litigation package for the blood sampling?

A. Yes, that's correct.

(Exhibit No. Barbieri 4, Sample History Report, marked for identification.)

(Exhibit No. Barbieri 5, Sample History Report, marked for identification.)

BY MR. MORIARTY:

Q. Okay. Now, when I reviewed this, I think the only time I saw your name on it may have been on a bill.

What was your active involvement, if any, regarding the blood analysis or the vitreous analysis?

A. Okay. When the blood analysis was done and the report was sent, I was not involved in any way.

Q. Okay.

A. The vitreous sample came to me in one of the cases I described as I picked up batches of cases. And I reviewed the data, and I initialed the inside of the forensic folder that I really reviewed that data prior to the report going out.

So my involvement was I saw the data for the vitreous, and I basically was the final reviewer for that set of data.

Q. Okay.

A. Then when the litigation packages -- the litigation package was requested for that sample, I reviewed the lit packs for both samples.

So I did see them at the time that these went out, so my name was on it.

Q. Who was the final reviewer of the blood sample?

A. It was Dr. Kevin Ballard.

Q. And when you reviewed the vitreous sampling, did you have available to you and did you review the blood sampling data?

A. It was available to me, but I did not review it.

Q. Okay.

A. At that time.

Q. All right. Have you been asked to prepare any other reports other than the material that you did for the analysis of the samples?

A. No.

Q. You know what reasonable degree of scientific probability or certainty means?

A. Yes.

Q. And that is different from speculation?

A. Yes.

Q. Are you familiar with what other NMS

employees have testified to about postmortem redistribution?

A. Not specifically. I know all of our toxicologists that we presently have have testified on that subject.

Q. Are you familiar with what any of the NMS toxicologists have testified to about PMR of digoxin?

A. No, I'm not.

Q. Do you periodically here at NMS have meetings of the toxicologists to discuss scientific issues?

A. Yes.

Q. Do you remember having any meetings about postmortem redistribution of digoxin?

A. I don't remember a meeting like that, no.

Q. Have you had any meetings about the reliability of postmortem vitreous samples?

A. Not that I can remember.

Q. As far as the references that you keep and use in your general practice, you keep and use Goodman and Gilman. Is that true?

A. I have that on my shelf, yes.

Q. And Clarke's, C-L-A-R-K-E, apostrophe S?

A. Yes.
Q. Baselt's?
A. Yes.
Q. Flanagan's?
A. No.
Q. What about Dart's?
A. No, I'm not familiar with that one.
Q. And you are a reviewer, I believe, for the Journal of Analytical Toxicology?
A. I am.
Q. Do you receive or regularly review the Journal of Forensic Science?
A. I receive it and I do read it.
Q. Is it a reliable journal?
A. Yes, it is.
Q. Do you, yourself, keep a specific research folder regarding postmortem redistribution in general?
A. I have some papers about postmortem redistribution in general. We also have an electronic file with some papers to that extent.
Q. Does NMS have a librarian?
A. Yes, we do.
Q. Do you have a personal research file regarding postmortem redistribution of digoxin?

A. No.
Q. Does NMS have a file about that?
A. As I remember, there are -- there may be a paper or two that I think I referred to and I have in my list, was an electronic file of digoxin itself which had some information, of course, in the article about PMR.
Q. Do you know how many articles there are in the NMS archive about postmortem redistribution of digoxin?
A. A handful. Probably less than a dozen.
Q. Do you know how many are actually published?
A. They would all be published papers.
Q. No.
Do you know how many have been published that may not be in your NMS library?
A. No, I have no idea.
Q. Did you do any independent research other than what might have been archived in the NMS library regarding PMR of digoxin?
A. I didn't focus on PMR of digoxin. I focused on digoxin vitreous levels, blood levels. And of course anything that came up in the articles that I read and I have today would be articles that involve

PMR.

Q. Okay. Have you ever seen any published literature that talks about the digoxin level in vitreous samples from living patients?

A. No.

Q. There is, however, a significant amount of published literature about digoxin serum levels in living patients, correct?

A. Yes.

Q. So did you receive these samples and specimens from another laboratory?

A. We received the samples from -- well, the client, called Analytical Research Laboratories. Both samples came from ARL.

Q. And how much business do you do with ARL?

A. I don't think we do a lot. I'm not, you know, privy to all the number of samples and the work that we get from each. But this is not a company that I see often as I'm reviewing data.

Q. Do you either know or can you surmise from your files why ARL sent the specimens here for analysis?

A. No.

Q. Could you look at Exhibit 2, please.

A. Sure.
Q. Page 203.
A. Okay, I have it.
Q. That's a chain of custody document?
A. Yes.
Q. And on 203, in the sort of large box up there, you see this description, it says Vitreous and heart blood, does it not?
A. Yes.
Q. And then down further, where the signatures and the data are about transmittals, under reason for transfer in line three, does it say: Send heart blood for analysis to NMS laboratories for digoxin?
A. It does.
Q. Is that in the handwriting of somebody from NMS?
A. No.
Q. That's from ARL?
A. My understanding, that would be from ARL.
Q. And those specimens would have been sent somewhere around July 31, 2008. Is that right?
A. Yes, that's right.
Q. And then line five, the reason --

A. I'm sorry, I'm sorry. Can I back up a minute?
Q. Yes, sir.
A. That's the blood specimen that we received.
Q. Correct.
A. About that. You said specimens, plural.
Even though this sheet says vitreous and heart, for the first sample we received only blood.
Q. Okay.
A. So that specimen was received at that time.
Q. All right.
A. Okay.
Q. And then line five, is line five with all that data, is that in the handwriting of somebody from NMS Labs?
A. No, it is not.
Q. And the reason for transfer there was: Send vitreous fluid for analysis to NMS laboratories for digoxin, correct?
A. Yes, that's correct.
Q. And that was sent somewhere right around September 16, 2008. Is that right?

A. Yes. And we received that on September 17, 2008.

Q. Do you know anything about why the vitreous sample was sent a month and a half after the blood sample?

A. I do not.

Q. Do you know if there were any discussions between ARL and NMS about the advisability of sending additional samples?

A. We have nothing in the notes that I could find for the case.

So, for example, if we had the blood sample already, we would have had notes put in the file that they were going to send a vitreous sample.

But I don't know if there was any other communication prior to us receiving any sample from them.

Q. Well, typically at NMS, if there is a phone call between people at a client and NMS about why certain specimens are going to be sent, is that documented?

A. Yes. We have -- the client service representatives have a notebook file for every call that they take. And that notebook file is kept for a

few months, and then it's discarded.

Q. Okay.

A. So after we receive a specimen and we have it logged into our system, then all notes that we get, whether it's with client services or toxicologist or a lab person, document it in the phone log notes under that work order number.

But prior testimony -- I shouldn't say testimony -- prior discussions, we don't have a work order in order to log it into. So they keep those separately.

Q. Okay. Do you know whether there is a separate phone log regarding any discussions between ARL or anyone else and NMS regarding these specimens?

A. They would be the -- after these are logged in, they would be in this lit pack.

Q. All right. So from your review, there's nothing that tells you whose idea it was to send the vitreous.

A. That's correct.

Q. Does NMS ever suggest to clients, Hey, we have analyzed this blood. Do you have any other specimens we can look at?

A. It happens occasionally.

Q. And then did NMS's billing go to ARL?

A. I don't know that.
Q. Do you know who paid the bill?
A. No, I do not.
Q. Did you ever have any communication at all with an organization called Private Autopsy Services in Oklahoma City?
A. Me personally?
Q. Yes.
A. No, I did not.
Q. Do you know if NMS did?
A. I do not.
Q. Did you see anything in the file that reflected communication between NMS and Private Autopsy Services?
A. No, I did not.
Q. Now, did Mr. Miller or anyone from his firm supply you with anything specifically about the Johnson case?
A. No.
Q. Have you -- now, you met with Mr. Miller yesterday, I believe, correct?
A. Yes, I did.
Q. Did he show you any medical records?
A. No, he did not.
Q. Did he bring you any specific medical or

toxicological literature?

A. No, he did not. He had some in his files, but he did not share them with me.

Q. He didn't show you any FDA documents or things of that nature?

A. No, sir, he did not.

Q. How long did that meeting last yesterday?

A. We talked about the case for about two and a half hours.

Q. Is that the only time that you have met with and spoken with Mr. Miller or somebody from his office?

A. No. We had communication before this got started, back in -- on September 22nd, we spoke for about a half an hour. It was myself, Mr. Miller and Ryan Deligans.

Q. And was that substantive or logistical?

A. I think it was more logistical. I think he was trying to see how we could help him, if we could help him, or if I could help him.

And we talked a little bit about, you know, my background in terms of digoxin and what I knew about it, and vitreous samples.

And we talked about the receipt of each

of these samples for the case.

Q. Okay.

A. And then he asked me to proceed with investigations of digoxin in terms of postmortem redistribution issues, and if I could find some kind of association between a vitreous level and a blood level.

Q. All right.

A. They were the two charges that I had for him.

Q. But you haven't written any separate reports about that?

A. No, I have not.

Q. And did you then conduct the research that you agreed to do?

A. I did.

Q. And did you bring it all with you today?

A. I did.

Q. Is there something called an NMS legal database report?

A. I'm not sure if that's the title we use, and I'm not sure specifically what you are asking. If you could help me a little bit.

Q. I think one of your colleagues testified and used that phrase, and I'm just wondering if it's

something familiar to you.

A. No, I'm not sure about that title. I mean, it could go under various other names. If you could describe, maybe I could help.

Q. Can't do it.

A. I'm sorry.

Q. Can't help you.

A. I mean, let me just assume for a moment, which I don't like to do but I will.

It could be a report that goes to a client based upon research that we do. For example, if Mr. Miller's office had asked me to write a written report, that may be what the other person was referring to.

Q. Okay. Now, when there is an analysis done like this of the blood specimen, does the -- is it significant to know the patient's hydration level?

A. Any information that a client can provide is always helpful if we have to interpret what we find.

Sometimes we get very detailed information about a case prior to us doing analytical work, and it may never go anywhere. The client just routinely submits it.

Other times we get nothing. We just get

a blood sample and say go for it.

Q. All right. So if you were going to interpret this blood level of 18 nanograms per milliliter, would you want to know the patient's level of hydration prior to death?

A. That would be an important consideration, yes.

Q. Would you want to know their renal status?

A. That would be very helpful as well.

Q. Would you want to know the site of the postmortem blood draw?

A. Without question.

Q. Would you want to know when it was drawn in relation to death?

A. Yes.

Q. And of course you would want to know how the samples were stored, things of that nature?

A. Yes.

Q. Would you also want to know when the patient took his or her last dose of a drug?

A. If the interpretation involved dosing issues and the levels, absolutely.

Q. All right. In this case do you know anything about Mrs. Johnson's level of hydration prior

to her death?

A. No, I do not.

Q. Do you know anything about her renal status?

A. No, I do not.

Q. Do you know anything about when she took her last dose of digoxin prior to her death?

A. Not specifically, no.

Q. Do you know what digoxin-like immunoreactive substances are?

A. Yes.

Q. Is there a way for a lab like NMS to rule out DLIS as a component of a postmortem blood sample?

A. Interesting question. The method we use for these cases involves a very specific method, LC tandem aspect.

Based on the ion fragmentation of true digoxin, its molecular weight and its mass after fragmentation, these immunoreactive substances would probably not show up in the analyses because they would have different molecular weights and different fragmentation.

So I guess if we were to compare an immunoassay procedure, levels of digoxin in an

immunoassay procedure, which could pick up these compounds versus an LC tandem MS, we could sort out some differences.

Q. So in this case, when the level is 18 nanograms per milliliter, in general is there an error rate associated with that number?

A. Well, every assay has an error rate, so yes. We typically use, for even these very technical type of analyses, plus or minus 20 percent as an acceptable range.

Q. Okay. And as part of projecting the error rate, is the DLIS part of that, or is that not part of what you're thinking when you pitch that error rate?

A. DLIS. Could you specify?

Q. The digoxin-like immunoreactive substances.

A. No. We are looking at digoxin itself.

Q. All right. In your file there was a subpoena and a notice of deposition for today, correct?

A. Yes.

Q. And that was served on you last Friday, I think, right?

A. Yes.

Q. I want to go over the duces tecum and see what you brought and what you didn't bring, okay?
A. Okay.
Q. It's kind of long.
A. This is a copy that I have?
Q. Yes. Somewhere in there is the duces tecum. It's actually 19 items long with subparts. I'll try to get through it quickly.
A. Yes, I have it here.
Q. All right. Documents that refer to and reflect communications between you, other NMS Labs employees, plaintiff's attorneys, ARL, et cetera.
Is that all here?
A. We think we have everything here.
Q. Okay. Complete file regarding the Johnson specimens.
Is that here?
A. Yes.
Q. Everything you used to form opinions regarding the Johnson specimens.
Is that all here?
A. Yes.
Q. Books, treatises, journals which you or other NMS employees referred to to formulate opinions about this.

Did you bring those?

A. I don't know if any other employees were involved in this case.

Q. Okay.

A. If they were not, then obviously there's no information.

Q. Okay.

A. But everything that I have is specific for this case, and I brought everything with me.

Q. All right. Any other documents that you referred to? Is there anything other than what you brought that you referred to?

A. No.

Q. Do you have any demonstrative exhibits?

A. No.

Q. Like charts, graphs, photographs, things like that?

A. No, nothing like that.

Q. Other than the chromatographs that are actually in your file, right?

A. Right, of course.

Q. Item 7 asks for your deposition list. Deposition list, I saw that in your file somewhere.

Is that in there?

A. I have this, yes.

Q. Okay.
A. Would you like that now?
Q. Sure.
A. This is trials and depositions. In the back the depositions are not complete, there are some documents, some old documents we could not get ahold of. But the trial transcript list is complete.
And as we spoke earlier, there's nothing there in which I have testified about digoxin in a court of law or deposition.
Q. And the testimony list is Exhibit 6, correct?
A. Okay.
(Exhibit No. Barbieri 6, Listing of Courtroom Testimony and Testimony via Depositions, 2001 to the Present, marked for identification.)
BY MR. MORIARTY:
Q. I think we can skip eight.
Nine was your CV.
You brought that, we marked it, correct?
A. Yes.
Q. Ten I think was covered by an earlier one, so we'll skip that.
Number 11: Any documents that reflect the number of digoxin tablets that NMS has tested

since April 25, 2008.

Did you bring any of that?

A. I have no knowledge of that. We'd have to get that from some records, but that may create a problem because of confidentiality.

Q. Well, they can be redacted.

But is anybody at NMS looking for that information?

A. We have not done that, no.

Q. Okay.

A. There's certain pieces that we contacted Mr. Miller's office and said when we received this -- I mean, our warehouse is huge, and we didn't have time to get some of these documents.

So if you want that, we will search for that. We have no problem searching after the fact for these things.

Q. I will let you know on that.

A. Okay.

Q. Twelve is the documents and files regarding the testing of the Johnson samples.

I assume that's all here, correct?

A. That's all here.

Q. Same with 13, which is chain of custody and shipping.

That's here, right?
A. Yes.
Q. Fourteen is documents describing the nature and condition of those samples.
That's here in your file, correct?
A. Yes.
Q. Fifteen, chain of custody, that's here?
A. Yes.
Q. Sixteen, your standard operating procedures for analyzing dig in blood serum or vitreous.
A. We do not have that. And since we are a private lab and that's proprietary, we will produce that if we have a court order for that.
Q. Okay. Those documents do exist, though?
A. They do exist, yes.
Q. We will let you know whether we need you to do that.
A. Okay.
Q. And obviously we'll jump through whatever hoops are necessary.
A. All right.
Q. Seventeen, QA/QC procedures for analyzing digoxin in blood serum or vitreous.
A. I don't have those. That would be part

of the validation package.

Q. Okay. So that would be essentially part of 16?

A. Yes. It would be in the method itself.

Q. Eighteen, the certificates of analysis for the standards used in the analysis here?

A. I do not have that. That would be part of the initial validation when the procedures were developed.

Q. Okay. So they are probably available, but you don't have them here.

A. They are available.

Q. Nineteen has to do with prep and analysis of standards, calibrators, quality controls, blanks, etc., regarding this specimen.

First of all, is this sort of data available?

A. Yes.

Q. And is it here?

A. Yes.

Q. In the file?

A. No, no, no, not personally in the file, no. This would be from our QC lab who prepares those samples.

So that documentation, again, is

available. We have to search it and find it for you.
Q. All right. And you didn't get the subpoena in time to actually do that before today, correct?
A. That's correct.
Q. So we'll let you know about that.
A. Okay.
Q. All right. Let's talk about digoxin a little bit.
With digoxin do some people benefit from concentrations over the therapeutic range?
A. Yes. You have individuals who are resistant to certain drugs, and so in a normal distribution of concentrations versus effect you will have some people who are the upper end of the curve.
Q. All right. And there are some who suffer significant toxicity at much lower levels, correct?
A. Yes. Even low therapeutic levels.
Q. Can electrolyte disturbances alter a patient's susceptibility to the toxic manifestations of digoxin?
A. Yes.
Q. And predispose those people to arrhythmias?

A. Yes.
Q. Would you agree that people can become digoxin toxic for a number of reasons?
A. Yes.
Q. And excessive dose is not the only one of those by any means?
A. No. Other medical conditions certainly will play a part as well.
Q. Okay. Now, so far as the pharmacokinetics of digoxin are concerned, does it bind? Does digoxin bind to tissues like the heart much more than it binds to blood?
A. Plasma proteins in blood I guess you really mean. Yes, it does.
Q. So when somebody dies, the -- whatever equilibrium has been created by the system stops, correct?
A. The equilibrium that occurs during the living individual will change after death.
Q. And does digoxin, as a drug, then diffuse from locations of higher concentration to locations of lower concentration?
A. Yes, it does.
Q. In other words, from tissues of the heart, for example, to blood pooled in the heart?

A. Yes, it will.
Q. Now, let me jump ahead a little bit to something.
As you can see from the results of the samples that were analyzed here, the blood and the vitreous results were substantially different, correct?
A. In terms of numerical value, absolutely they were.
Q. And could you tell us all, please, possible causes of that disparity.
A. Okay. One possible cause would be that the drug has not formed an equilibrium throughout the body, since the vitreous sample or the vitreous area has a lower blood flow than other organs in the body and may not have received enough drug to transfer.
Q. You are talking about antemortem?
A. This is all antemortem, yeah.
Q. Okay. Well, I don't mean to cut you off.
A. That's okay.
Q. But let me make sure that you and I are on the same wavelength.
A. Sure.
Q. I'm not trying to find out what are the

possible reasons that could occur in the living.

I'm trying to find out what are the possible reasons why there's such a difference here in these postmortem samples.

A. That I can't answer. We have basically the same type of procedure that's being used. So we are measuring the concentration of the compound in the sample that we received.

So analytically that's what we have. There should be no necessarily reason why one sample is different than the other analytically.

Q. Okay. Well, would one possibility to account for the difference be that digoxin redistributes postmortem substantially more in heart blood than it does in vitreous?

A. That could be a possibility, okay.

Q. Are there any other possible explanations that you can think of?

A. I'm eliminating the collection time and date, because I think they're equal in this case. So I can't think of any others.

Q. All right. So let's talk about postmortem toxicology in general a little bit.

A. Okay.

Q. Does postmortem toxicology differ

fundamentally from clinical toxicology?

A. Yes.

Q. Do different drugs have different extents of postmortem redistribution?

A. Absolutely.

Q. Some reports from NMS regarding other drugs contain information about postmortem redistribution, and I believe that is referred to as auto text.

Do you know what I'm talking about?

A. Well, I know about auto text, but I'm not sure I understand what you mean about reports.

Let me just -- if these were expert reports about a particular compound in a particular case, then, yes, there would be references to that.

So you are going to have to help me as far as what you are thinking.

Q. From an analytical sample of diltiazem in another case there was an auto text regarding the postmortem redistribution of diltiazem.

A. So we are talking about some reference comment that may be on a report. That's the auto text system basically.

Q. Right.

A. Okay.

Q. Do you have any explanation for why there is no auto text about PMR of digoxin in NMS blood reports?

A. Not a specific explanation of that.

When we write these reference comments, the purpose of the reference comment is to give the reader some information about the drug, about the concentration of the drug in a biological sampling, okay?

A little bit about the toxicity of the drug. Maybe there is information about how the drug is used; is it orally administered, is it an injectable, whatever.

There's no set pattern in terms of what we put into that. It's really a toxicologist will have developed that information, and it's modified over the years.

So in one case there may be postmortem information, in another there may not be.

Q. Okay.

A. I mean, all drugs have the possibility of PMR, and certainly not all of our reference comments even talk about that.

Q. Okay. Are toxicologists sometimes asked to project what a blood level should be if a person

takes a particular dose of a drug?

A. We are asked that.

Q. All right. And in the reverse, are toxicologists sometimes asked to use a blood level to predict what dose would have led to that blood level?

A. We, again, are asked that occasionally, yes.

Q. And would you agree with me that you can try to do that, but there are a lot of assumptions that have to be made?

A. Yes.

Q. And it's not a clean calculation?

A. It's certainly not a clean calculation.

Q. And it's -- well, we'll get into that in more detail.

Is it the consensus in the forensic toxicological community that you cannot calculate with scientific probability somebody's predeath drug level based on postmortem findings?

A. Yes.

Q. Can you make estimates?

A. Yes, we can.

Q. Would you agree that they are not necessarily accurate?

A. Well, they are not necessarily

accurate. Accuracy depends upon how precise you want the measurements to be.

But there's possibilities that they may not be accurate, certainly.

Q. Okay. Is it the consensus in the forensic toxicologic community that you can't calculate the scientific probability somebody's predeath dose based on postmortem blood findings?

A. Not an exact calculation. Again, we can give a range, and oftentimes that range is quite wide.

Q. Okay. And the bottom line is that digoxin does redistribute after death?

A. It does.

(Discussion off the record.)

(A recess is held.)

BY MR. MORIARTY:

Q. Does NMS prefer peripheral drug -- blood draws when it does post postmortem forensic work?

A. Well, we don't prefer. We recommend to have peripheral blood for quantitation.

We actually recommend that because of limited volume of peripheral blood in many cases, that if we do any screening, we'll do it on heart blood. And then we like to quantify on a peripheral sample.

Q. All right. If you had your choice for

quantification, you'd take femoral blood every time over heart blood, wouldn't you?

A. Yes, we would.

Q. Does your Website advocate that?

A. Yes.

Q. Does your Website indicate that one of the reasons that you want to do that is because postmortem redistribution can cause falsely elevated blood concentrations?

A. I haven't read that in the Website in a while, but I'm assuming -- that would be the purpose of it.

Q. Now, would you agree with Professor Clarke's book that when attempting to interpret drug concentrations, forensic toxicologists traditionally have placed a great deal of faith in the assumption that postmortem concentration of the substance at least approximates that present at the moment of death; but over the years we have learned that such faith is often misplaced.

A. A good statement.

Q. Would you agree with Clarke's text that one of the most important factors affecting the interpretation of postmortem drug concentrations is the phenomenon of postmortem redistribution?

A. Yes.

Q. Would you agree with Clarke's text that concentration of some drugs can increase by as much as two to tenfold after death in postmortem blood?

A. There are drugs like that, yes.

Q. Do you agree with Clarke's text that rarely can pharmacokinetics be applied successfully to postmortem toxicology?

A. Yes.

Q. Do you agree with Clarke's text that for living people to determine the dose from a single plasma or blood concentration is fraught with uncertainty, and the problem is even more complex for postmortem cases?

A. Yes.

Q. Do you agree with Clarke's text that in most instances pharmacokinetic calculations using postmortem blood measurements are rarely defensible forensically?

A. I don't know if I agree to that.

I think if you are defending something like that and you put caveats on it and you list the assumptions that you make, or if you are looking at ranges of levels rather than specific numbers, then I would agree.

But possibly I wouldn't agree.

Q. Okay. Can you name a single peer-reviewed publication that indicates that you as a forensic toxicologist can reliably use postmortem heart blood samples to calculate antemortem serum digoxin concentrations?

A. I'm sure there's an article out there. I could not -- I would not accept that thesis. And if the article said that, I would not agree with it.

Q. Okay. Can you name any peer-reviewed publications that say you can -- you as a forensic toxicologist can reliably use postmortem heart blood specimens to calculate predeath doses of digoxin?

A. No.

Q. In your review of any postmortem digoxin blood literature, what was the longest time postdeath that the samples were drawn?

A. We are talking human now, right?

Q. Human.

A. I'm thinking in the papers that I saw they were 24 hours.

Q. Okay. Do you know what the -- all right.

Do you know what the longest draw times were in animals?